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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/595,764	05/10/2006	Jacques Granger	10064	6239

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EXAMINER	
LIU, XUE H	

ART UNIT	PAPER NUMBER
1742	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/595,764	GRANGER ET AL.	
	Examiner	Art Unit	
	XUE LIU	1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 June 2011*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

5)☒ Claim(s) *49-104* is/are pending in the application.

5a) Of the above claim(s) *97-104* is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *49-71 and 74-96* is/are rejected.

8)☒ Claim(s) *72 and 73* is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

12)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *5/10/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of claims 49-96 in the reply filed on 6/22/11 is acknowledged.

2. Claims 97-105 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 6/22/11.

Claim Objections

3. Claim 66 is objected to because of the following informalities: the claim should be ended with a period. Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 49-50, 53, 60, 74, 80, 88, 92, 94 and 96 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spelman et al. (GB 1088551) in view of Erickson (US 3,631,899) and Levine et al. (US 4,576,207).

Regarding claim 49, Spelman et al. teaches a method for the production of caps having a heat shrinkable skirt (see page 1, ln. 75-81, "for the production of a secondary closure for a bottle the said blank initially comprises a length of heat-shrinkable thermoplastic tubing, the said

former being of conical shape, so that the resulting pre-shaped closure comprises a fusto-conical skirt") comprising:

(a) extruding a thermoplastic material to form a tube having a first diameter D0, a first thickness E0, and a first cross-sectional area S0 (see page 1, ln. 66-70, "advantageously a blank for use in the method may be produced by cutting sections from an extruded thermoplastic tube prestretchd in such a manner as to render the tubing heat-shrinkable");

(b) pre-stretching the extruded thermoplastic tube in such a manner as to render the tubing heat-shrinkable (see page 1, ln. 66-70);

(c) segmenting the pre-stretched tube into portions of desired length ("cutting sections from an extruded tube", see page 1, ln. 67-68);

(d) forming a cap blank by heat shrinking one of the portion on a mandrel (see page 1, ln. 51-59, "the present invention provides a method of forming the pre-shaped shrink-on closures of thermoplastic material, wherein a blank of thermoplastic material which has been rendered heat-shrinkable is placed on a former of the desired shape, is subjected to heat in order to cause it to shrink onto said former and is then cooled and removed from the former"); and

(e) providing a head (disc 4) on the cap blank to form a cap having a head and a skirt (skirt portion 1a) (see figs. 1-2).

Spelman et al. does not positively teach that the extruded thermoplastic tube is prestretched by drawing the tube in an axial direction, the axially drawn tube having a second diameter D1 less than the first diameter D0, a second thickness E1 less than the first thickness E0, and a second cross-sectional area S1, the ratio of the first cross-sectional area to the second cross-sectional area between about 2 and 10; increasing the diameter of the drawn tube to form a

radially-expanded tube having a third diameter D2 greater than the first and second diameters; and passing the radially-drawn tube through an axial tension assembly. However, Levine et al. teaches a heat shrinkable tubing is radially-expanded and passed through an axial tension assembly to impart the desired degree of linear shrinkage characteristics (see col. 2, ln. 55-63). It would have been obvious to one of ordinary skill in the art at the time of the invention to pre-stretch the tubing in the process of Spelman et al. according to the teaching of Levine et al. since Levine et al. teaches that the method insures smooth conformity of the tubing to complex shaped articles being covered (see col. 1, ln. 48-56).

Spelman et al. as modified by Levine et al. does not teach the step of drawing the tube in an axial direction, the axially drawn tube having a second diameter D1 less than the first diameter D0, a second thickness E1 less than the first thickness E0, and a second cross-sectional area S1, the ratio of the first cross-sectional area to the second cross-sectional area between about 2 and 10. However, Erickson teaches that heat shrinkable tubing may be made by extruding a tube and subjecting it to stretch in a first direction and then stretched again in the second direction (see abstract, col. 2, ln. 14-53). It would have been obvious to one of ordinary skill in the art at the time of the invention to further modify Spelman et al. with the teaching of Erickson since Erickson teaches that to obtain the best radial-shrinkable tubing having a minimum length shrinkage, the tubing is stretched first in the machine direction (axial drawing), and then stretched in the transverse direction (see col. 3, ln. 69-74). It would have been obvious to one of ordinary skill in the art at the time of the invention that drawing the tube in the axial direction according to Erickson's teaching results in the drawn tube having a second diameter D1 less than the first diameter D0, a second thickness E1 less than the first thickness E0, and a second cross-

sectional area S1, the ratio of the first cross-sectional area to the second cross-sectional area between about 2 and 10 since Erickson teaches drawing between about 2.6 and 3.2 times in the machine direction (see col. 3, ln. 71-72).

Regarding claim 50, Erickson teaches a cooling zone is provided subsequent to drawing the tube in an axial direction, the axially drawn tube at a first temperature T0 (the first orientation temperature at the length-orienter), the cooling zone having a cooling assembly (cooling blower) to lower the temperature of the axially drawn tube to a second temperature T1, the second temperature is at a temperature below the first orientation temperature to interrupt the axial drawing step and to fix the diameter of the axially drawn tube at a generally predetermined diameter (see col. 3, ln. 2-col. 4, ln. 13 and table 1).

Regarding claim 53, Erickson teaches that the cooling apparatus includes high-velocity air-impingement nozzles (see col. 3, ln. 6-8).

Regarding claim 60, Levine teaches that a positive pressure is imparted to the inside of the heated tubing to cause the desired degree of radial expansion (col. 2, ln. 57-59).

Regarding claim 74, Erickson teaches that the thermoplastic material comprises PET (see claim 2).

Regarding claim 80, Spelman teaches that the length of the tube portions is about the height H of the cap and in which a disc 4 with a curved edge (rebate 4a) is provided to form the head of the cap, the disc being assembled with the cap blank (see fig. 1-2).

Regarding claim 88, Spelman teaches that the upper surface of the disc 4 may be printed or embossed and the skirt may also be printed and/or distinctively colored (page 2 ln. 90-93).

Regarding claim 92, Spelman teaches that the skirt may be distinctly colored (see page 2, ln. 92-93).

Regarding claim 94, Spelman teaches that the skirt 1a may be provided with perforations to facilitate tearing of the secondary closure when it is to be removed from the bottle (page 3 ln. 90-93).

Regarding claim 96, it would have been obvious to one of ordinary skill in the art at the time of the invention to perform the processing steps (a)-(e) continuously because the court held that continuous operation are generally obvious in light of the batch process of the prior art. In re Dilnot, 319 F.2d 188, 138 USPQ 248.

6. Claims 51-52 and 65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spelman et al. as modified by Erickson and Levine as applied to claim 50 above, and further in view of Hagen (GB701,436).

Regarding claims 51-52, Spelman as modified does not teach that the thermoplastic material is extruded at an extrusion temperature and the change in temperature from the extrusion temperature to the second temperature is between about 30 deg C to 150 deg C. However, Hagen teaches extrusion at about 140 deg C and temporarily stabilizing the expanded or contracted shape by cooling to a temperature at which the elasticity is sufficiently reduced, which is 40 deg C or below (see page 2, ln. 55-65). It would have been obvious to one of ordinary skill in the art at the time of the invention to further modify Spelman with the teaching of Hagen in order to sufficiently reduce the elasticity of the shaped tubing to temporarily stabilize the drawn shape.

Regarding claim 65, Hagen teaches cooling the radially-expanded tube in an auxiliary cooing assembly to a temperature T2 of 40 deg C or below (see page 2, ln. 61-65).

7. Claims 54 and 56-58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spelman as modified by Erickson and Levine as applied to claim 50 above, and further in view of Takagi et al. (US 3,752,630).

Regarding claim 54, Spelman as modified does not teach that the cooling apparatus comprises a ring cooled with air or water. However, Takagi et al. teaches a heat shrinkable tubing is cooled down with by the cooling water filled in the water chamber 10' which is in the shape of a ring (see abstract, fig. 2-3 and col. 3, ln. 43-45). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the cooling device taught by Takagi et al. in the process of Spelman et al. since Takagi et al. teaches that a ring cooled with air or water is a suitable cooling device for cooling an extruded tubing.

Regarding claim 56, Takagi et al. teaches that the cooling means includes air or water projection (air pipe 4) provided inside the axially drawn tube S (see fig. 1-3).

Regarding claim 57, Takagi et al. teaches that the diameter of the drawn tube is increased using a radial expansion assembly that includes a radial expansion chamber (mould-center member B) provided with an inner wall having a diameter equal to about D2 and an expansion area (conical-shaped top portion 7 with a smooth-expanding sloped surface) for increasing the diameter of the axially drawn tube from D1 to D2 ("in the course of sliding along the conical-shaped surface 7 of top portion of said mould center B, said tube S is gradually expanded and when it passes the sloped surface and reaches the outer periphery of the cylindrical body 8, its

diameter is fully expanded to a desired size to become an expanded tubs S'", see col. 3, ln. 37-45 and figs. 1-3).

Regarding claim 58, Takagi et al. teaches the radial expansion device (mould-center member B) includes an entry ring (conical shaped-top portion 7) with diameter of about D1 to provide the axially drawn tube with a diameter D1 before radial expansion of the axially drawn tube (see figs. 1-3).

8. Claim 55 is rejected under 35 U.S.C. 103(a) as being unpatentable over Spelman as modified by Erickson, Takagi and Levine as applied to claim 54 above, and further in view of Granger (2004/0070104) as English translation of WO 02/43945.

Regarding claim 55, Takagi does not teach that the ring includes a part with diameter equal to about D0 so as to form a calibration ring from which a tube having a diameter of about D0 exits. However, Granger teaches that the extruded tube having a diameter D0 (D_1) exits from a calibration ring 31 (see fig. 1). It would have been obvious to one of ordinary skill in the art at the time of the invention to further modify Spelman with the calibration ring taught by Granger since Granger teaches that the calibrating ring ensures that the variation of the diameter remains less than 5% to obtain caps with excellent geometric uniformity in terms of the diameter so that the skirt of the cap is perfectly smooth and uniform once the cap has been het shrunk onto the neck to be capped (see para 49-50).

9. Claims 59 and 61-62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spelman as modified by Erickson, Takagi and Levine as applied to claim 58 or claim 60 above, and further in view of Elleray et al. (GB1380397).

Regarding claim 59, Takagi teaches that the entry ring 7 forms an annular chamber with an inner surface having an inner diameter D1 (see figs. 1-3). Takagi does not teach that the inner surface comprises a plurality of orifices for providing a vacuum, the annular chamber being put under a pressure Pa less than atmospheric pressure P, wherein the axially drawn tube is pushed into contact with the inner surface. However, Elleray et al. teaches that suction is applied to the expansion chamber at a number of places spaced along the tubular portion thereof and preferably at each position suction ports (orifices) are distributed evenly about the circumference (page 1, ln. 85-90) and applying suction to the said chamber to establish across the wall of the tube a pressure differential sufficient to distend the tube sensibly into contact with the said tubular portion of the chamber (page 1, l. 18-20 and 62-66 and page 2, ln. 44-48, "the expansion chamber is evacuated to 34.5 to 83 kN/m^3 (below atmospheric) through ports 9 and ducts 10, and the tubing emerges from the vacuum chamber"). It would have been obvious to one of ordinary skill in the art at the time of the invention to further modify Spelman with the teaching of Elleray et al. since Elleray teaches that it is know that extruded tubing can be expanded by a fluid pressure differential (see page 1, ln. 14-20).

Regarding claim 61, Elleray teaches that the diameter of the drawn tube is increased by maintaining the drawn tube under a vacuum (see page 2, l. 44-48).

Regarding claim 62, Elleray teaches that the inner wall of the radial expansion assembly is a tubular metallic wall (tubular expansion chamber 7) capable of allowing air to pass through (see figs. 1-2).

10. Claims 64, 75-77, 81, 84-85 and 89are rejected under 35 U.S.C. 103(a) as being unpatentable over Spelman as modified by Erickson and Levine as applied to claim 49, 74 or 88

above, and further in view of Granger (2004/0070104) as English translation of WO 02/0070104).

Regarding claims 75 and 77, Erickson does not teach that the thermoplastic material comprises at least one second thermoplastic material with a glass transition temperature Tg less than 50 deg C, the at least one second thermoplastic material selected from the group consisting of polyolefins, ethylene copolymers, ethylene and propylene copolymers, thermoplastic elastomers, and combinations thereof. However, Granger teaches that the plastic material may comprise a polyolefin chosen from among PE, PP and PB, ethylene and propylene copolymers, or an elastomer, or a mix of these different polymers in the form of a single layer material or a multiple layer material (see para 42). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a composition that includes both PET and polyolefin for forming the heat-shrinkable tubing since both PET and polyolefin are known to be useful as heat-shrinkable materials.

Regarding claim 76, it would have been obvious to one of ordinary skill in the art at the time of the invention to optimize the percentage of PET and polyolefin in the composition absent evidence of the criticality of the claimed volume percentage.

Regarding claim 64, Spelman as modified does not teach that the increase of the diameter from D1 to D2 is at least about 10 mm, the increase of the diameter occurring over a distance L1 less than about 250 mm. However, Granger teaches the increase of the diameter from D1 (see para 76, extruded tube 20 with a 20 mm diameter D1) to D2 (para 78, "tube 21 was then expanded to a diameter D2 of 30 mm") is at least about 10 mm, the increase of the diameter occurring over a distance L1 less than about 250 mm (see fig. 1, which shows that the tube is

expanded over a very short distance). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Spelman with Granger since they are both related to the field of closing caps with a heat shrinkable skirt (see para 2).

Regarding claim 79, Granger teaches that the plastic material may contain a micronized charge typically composed from among talc, calcium carbonate barium sulphate, titanium oxide, organic or mineral pigments, or any other filler known to result in particular visual effets or a particular feel (see para 43).

Regarding claim 81, Granger teaches that the disc may be obtained by cutting out a sheet or strip of material into a material chosen from among plastic and metallic materials, or paper, or cardboard or multiple layer assemblies of these materials (see para 58).

Regarding claim 84, Granger teaches that an insert 8 comprising a head 80 and a skirt 81 is provided with the tube portion, the insert being placed at an upper end of the mandrel 401, prior to heat shrinking of the tube portion 23 to assemble the insert and the heat-shrunk cap blank (see fig. 4 and para 61).

Regarding claim 85, Granger teaches that the insert may include threading, sealing means typically a seal, so as to form a closing cap (para 62).

Regarding claim 89, Granger teaches that the printing may be done using inks that can be cross-linked under radiation at a temperature less than the temperature at which the cap is heat shrunk (para 64).

11. Claims 66, 68-69 and 86-87 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spelman as modified by Erickson and Levine as applied to claim 49 above, and further in view of National Carbon (GB468762).

Regarding claim 66, Spelman as modified does not teach that the thermoplastic material is extruded using a die having a diameter D0 between about 20 mm to 50 mm and thickness E0 between about 0.5 mm to 3mm. However, National Carbon teaches a heat-shrinkable closure seal is formed by extruding from an extrusion device having a diameter D0 of ½ inch diameter (12.7 mm) and thickness in the range between about 0.5 mm to 3 mm (because the expanded thickness is 0.15 inch, or 0.38 mm), see page 4, ln. 5-12. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Spelman with National Carbon to extrude the heat-shrinkable tubing having the claimed initial thickness and diameter depending on the final dimensions of the caps.

Regarding claim 68, National Carbon teaches that the diameter D1 of the axially drawn tube is 1/4 inch or 6.35 mm and the thickness E1 is 0.015 inch or 0.38 mm, the ratio of D1/D0 being 0.5 (because D0 is 1/2 inch or 12.7mm) and the ratio of E1/E0 is also 0.5 because the ratio of the thickness should match the ratio of the diameter (see page 3, ln. 51-54 and page 4, ln. 10-12).

Regarding claim 69, National Carbon teaches that the diameter D2 of the radially expanded tube is 1 1/32 inch or 26.19 mm and the thickness E2 is 0.015 inch or 0.38 mm (see page 4, ln. 10-12). It would have been obvious to one of ordinary skill in the art at the time of the invention to obtain a ratio D2/D1 of no more than about 2 and the ratio of E2/E1 being no more than about 0.6 depending on the dimension of the heat-shrinkable tube after the axial stretch.

Regarding claim 86, National Carbon teaches that the length of the tube portion 20 is greater than the height of the cap, the tube portion comprising a lower part for forming the skirt

of the cap and an upper part for forming the head of the cap, the head being formed by compressing the upper part between the die and a head of the cap 10 (see fig. 1-5).

Regarding claim 87, National Carbon teaches that the head (contain screw cap 42) is formed simultaneously with assembly of an auxiliary part introduced into the container before compressing, the auxiliary part forming an excise means (see page 3, ln. 109-119, "a tamper proof cap seal is formed by inserting an expandible rod 48 through the apertures in the cap and within the groove, after which heat is applied to the rod to expand the same and lock the cap securely to the container wall in obvious manner. The screw cap is thus locked in place, and cannot be removed from the container without breaking the rod 48").

12. Claim 67 is rejected under 35 U.S.C. 103(a) as being unpatentable over Spelman as modified by Erickson, National Carbon, and Levine as applied to claim 66 above, and further in view of Granger (2004/0070104) as English translation of WO 02/43945.

Regarding claim 67, Spelman as modified does not teach that the thermoplastic material passes through the die at a rate of about 10 kg to 100 kg per hour. However, Granger teaches that the heat-shrinkable tube is extruded at a rate of 30 m/minute (see para 76). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to optimize the extrusion speed to 10 kg to 100 kg/per hour depending on the density and dimension of the extruded tubing.

13. Claims 70-71 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spelman as modified by Erickson and Levine as applied to claim 50 above, and further in view of Reed et al. (US 4,735,538).

Regarding claim 70, Spelman as modified does not teach that a radial expansion assembly is positioned at a distance L from a die for extruding the thermoplastic material, the radial expansion assembly being generally free to move in an axial direction, the distance L selected to provide a sufficient degree of axial drawing and cooling of the axially drawn tube. However, reed et al. teaches a process for forming a biaxially oriented thermoplastic tube by using a radial expansion assembly that is free to move in an axial direction as the tube portion is longitudinally stretched (see abstract and fig.1-5). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Spelman with the teaching of Reed since Reed teaches that the method may be applied to the manufacture of tubular articles from thermoplastic material which is at least partly biaxially oriented (see col. 3, ln. 31-37).

Regarding claim 71, Levine teaches that the cooling assembly (cooling bath 35) is positioned at a distance L0 < L from the die (extrusion head 34) (see fig. 3).

14. Claims 82-83 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spelman as modified by Levine, Granger and Erickson as applied to claim 81 above, and further in view of National Carbon (GB 468,762).

Regarding claims 82-83, Spelman as modified does not teach that the disc is an excise disc for identifying the cap for monitoring packaged products and providing an anti-fraud and anti-theft assembly. However, National Carbon teaches at page 3, ln. 109-119, "a tamper proof cap seal is formed by inserting an expandible rod 48 through the apertures in the cap and within the groove, after which heat is applied to the rod to expand the same and lock the cap securely to the container wall in obvious manner. The screw cap is thus locked in place, and cannot be removed from the container without breaking the rod 48". Therefore, it would have been obvious

to one of ordinary skill in the art at the time of the invention to modify Spelman with the tamper proof cap seal taught by National Carbon in order to secure the container from tampering.

15. Claim 95 is rejected under 35 U.S.C. 103(a) as being unpatentable over Spelman as modified by Erickson and Levine as applied to claim 49 above, and further in view of Elleray et al. (GB 1,380,397).

Regarding claim 95, Levine does not teach that the axial tension assembly includes two driving rollers or two belt type pullers. However, Elleray et al. teaches that the completed tubing is advanced by a belt grip traction device 12 comprising two belt type rollers (see fig. 1 and page 2, ln. 53-54). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the belt grip device taught by Elleray et al. as the axial tension assembly to apply tension and advance the tubing at the same time.

16. Claim 63 is rejected under 35 U.S.C. 103(a) as being unpatentable over Spelman as modified by Erickson, Takagi, Elleray and Levine as applied to claim 61 above, and further in view of Okabe et al. (US 4,948,006).

Regarding claim 63, Spelman as modified does not teach that the inner wall of the radial expansion assembly is surface treated. However, Okabe et al. teaches that the interior of the cavity is preliminarily heated and the wall surface thereof is treated by a working such as Teflon working to further improve the releasing of the product from the mold cavity (see col. 26, ln. 63-68). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide surface treatment to the inner wall of the radial expansion assembly in order to facilitate mold release of the expanded tubing from the radial expansion assembly.

17. Claim 78 is rejected under 35 U.S.C. 103(a) as being unpatentable over Spelman as modified by Erickson, Levine, and Granger as applied to claim 77 above, and further in view of Iwanami et al. (US 4,954,557).

Regarding claim 78, Spelman as modified does not teach that the multi-layer material includes an internal adhesive layer. However, Iwanami et al. teaches that adhesive layers are used to give multi-layer laminates of different layers (see col. 1, ln. 43-50). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include an internal adhesive layer to bond the layers in a laminate.

Allowable Subject Matter

18. Claims 72-73 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

19. The following is a statement of reasons for the indication of allowable subject matter: Regarding claim 72, the claim recites that a change in the pressure Pa inside the annular chamber of the radial expansion assembly results in displacement of the cooling assembly by a distance delta L0, wherein any increase in pressure Pa causing a decrease in the diameter D1 of the axially drawn tube being corrected by a negative displacement delta L0 sufficient to increase the diameter of the axially drawn tube to D1. Claim 73 depends from claim 72 and further recites that the displacement delta L0 is controlled by an increase in an axial tension force Ft applied by the axial tension assembly, in which the increase in the axial tension force Ft is corrected by a

positive displacement delta L0 sufficient to reduce the diameter of the axially drawn tube to D1. The subject matter of claims 72 and 73 are not disclosed in the cited prior art.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to XUE LIU whose telephone number is (571)270-5522. The examiner can normally be reached on Monday to Friday 9:30 - 6:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on (571)272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/X. L./
Examiner, Art Unit 1742

/Christina Johnson/
Supervisory Patent Examiner, Art Unit 1742